

15. City of Phoenix

The City of Phoenix is also known as the Valley of the Sun and is the sixth largest city in the nation. Phoenix, also the center of the rapidly growing Southwest, is the capital of Arizona and the Maricopa County seat. The City of Phoenix has a diversified economic base with manufacturing as a lead employer. The local economy of Phoenix also includes retail trade, electronics, tourism, and the service sector. Climate has been a major factor in economic development as the area experiences sunshine nearly every day of the year. The City of Phoenix MPA is located north of Pecos Road, west of Scottsdale Road, east of 107th Avenue in the southern part and 67th Avenue in the northern part, and south of Carefree Highway.

According to the ADWR Annual Water Withdrawal and Use Report, in the City of Phoenix in 1998, 13,398 af of groundwater were pumped and delivered. Water received from other sources included 175,559 af of SRP water and 157,708 af of groundwater from other IDs. Of the total 333,267 af from other sources, 11,138 af were used as backwash to Phoenix canals, leaving a total of 322, 128 af received from other sources. Of the total 335,527 af of water available for use (13,398 + 175,559), 57,858 af were delivered to other users, leaving 277,689 af of water for use in the City of Phoenix MPA.

A. Plans to Take and Use CAP Water

The City of Phoenix currently has a contract for 113,914 af of CAP water. The allocation includes 113,882 af received under the 1983 allocation and an additional 32 af that was transferred from the Berneil Water Company. Under the Settlement Alternative the City of Phoenix would receive an additional 8,206 af of CAP water. That CAP water would be delivered for a 50-year contract period (i.e., from 2001-2051). The CAP water would be used to supplement both current and projected water supply demands over the next 50 years and would help reduce the continuing dependence on pumping groundwater from an overdrafted groundwater system. Table L-M&I-87 outlines the proposed allocations by alternative.

Table L-M&I-87 CAP Allocation Draft EIS City of Phoenix – Proposed CAP Allocation		
Alternative	Allocation (in afa)	Priority
Settlement Alternative	8,206	M&I
No Action	0	-
Non-Settlement Alternative 1	8,206	M&I
Non-Settlement Alternative 2	0	-
Non-Settlement Alternative 3A	0	-
Non-Settlement Alternative 3B	8,977	NIA
Existing CAP Allocation	113,914	-

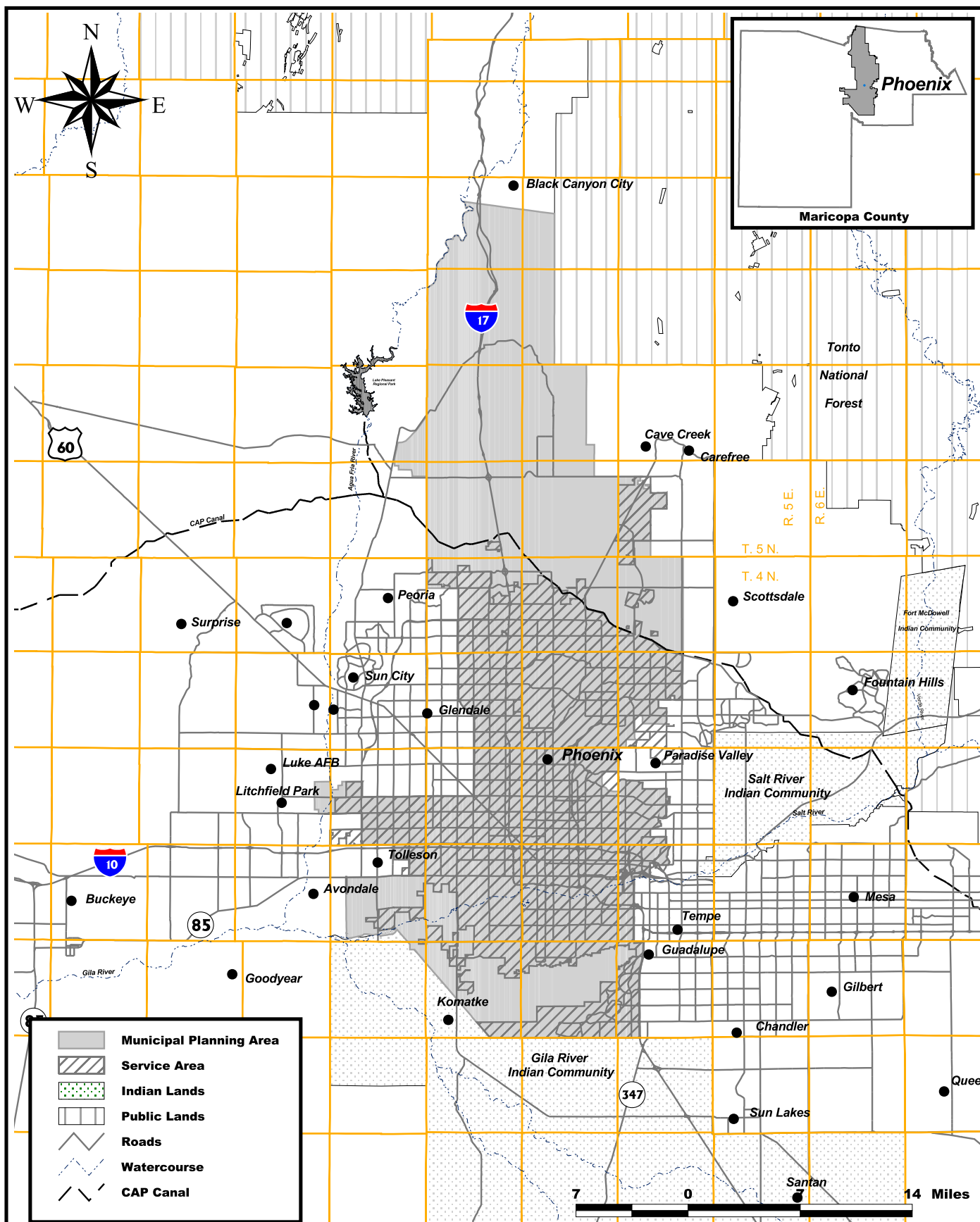
Figure L-M&I-44 shows the service area and planning area for the City of Phoenix. The service area covers approximately 219,714 acres, and the MPA covers approximately 412,750 acres. The City of Phoenix currently has five water treatment plants. The Union Hills plant has a capacity of 179,200 afa and currently receives CAP water. The Val Vista plant has the capacity of 145,600 afa, and currently receives both SRP and CAP water. The Verde plant has the capacity of 56,000 afa, and currently receives SRP water. The Deer Valley plant has the capacity of 168,000 afa, and currently receives both SRP and CAP water. The Squaw Peak plant has a capacity of 156,800 afa and currently receives both SRP and CAP water. Phoenix also is planning to construct the Lake Pleasant Water Treatment Plant, sited on the east side of the Waddell Canal. This plant would treat CAP water and is planned to deliver 89,760 afa, with an ultimate capacity of 359,000 af. While the City of Phoenix could take their existing and proposed CAP allocations through any combination of these water treatment plants, it is most likely that the CAP water would be treated at the Union Hills and Lake Pleasant water treatment plants. The City of Phoenix also is entitled to 80,000 afa of capacity in the GRUSP recharge facility (Larson 2000).

B. Population Projection

In 1985, the population in the City of Phoenix was 307,412. The estimated 2001 population is 1,288,409 and the estimated 2051 population level is 2,548,666.

C. Water Demand and Supply Quantities

As previously shown in Appendix C–M&I Sector Water Uses, it is estimated that water demand in the City of Phoenix would increase from 291,861 af in year 2001 to 498,722 af in year 2051. The projected water uses both by water source and alternatives are provided below in Table L-M&I-88. Based on anticipated water demands, CAP water which would



June 2000

CAP Allocation Draft EIS **General Location Map** **City of Phoenix**

Figure #L-M&I-44

be allocated under the Settlement Alternative would provide three percent and two percent of the current estimated water supply required for the City of Phoenix for the years 2001 and 2051, respectively.

Table L – M&I-88
CAP Allocation Draft EIS Appendix L
City of Phoenix – Projected Water Use

Alternative	Annual CAP Deliveries		Ground-water		Effluent		CAGR D Ground-Water		Other Surface Water		Total Demand	
	2001	2051	2001	2051	2001	2051	2001	2051	2001	2051	2001	2051
Settlement Alternative	101,262	149,345	34,822	34,822	0	41,541	0	16,362	155,776	335,271	291,861	577,341
No Action	101,262	135,282	34,822	34,822	0	41,541	0	30,425	155,776	335,271	291,861	577,341
Non-Settlement Alternative 1	101,262	143,488	34,822	34,822	0	41,541	0	22,219	155,776	335,271	291,861	577,341
Non-Settlement Alternative 2	101,262	135,282	34,822	34,822	0	41,541	0	30,425	155,776	335,271	291,861	577,341
Non-Settlement Alternative 3A	101,262	135,282	34,822	34,822	0	41,541	0	30,425	155,776	335,271	291,861	577,341
Non-Settlement Alternative 3B	101,262	143,488	34,822	34,822	0	41,541	0	22,219	155,776	335,271	291,861	577,341

Note: A more detailed breakdown of supplies may be found in Appendix C.

It is estimated that the demand for water at the end of the CAP contract period would be approximately 577,341 af. For all alternatives, there is estimated to be no unmet demand. In the Settlement Alternative, Non-Settlement Alternative 1 3B, 8,206 afa of demand are met by the additional CAP allocation. Alternatively, this 8,206 afa of demand are met by CAGR D membership under the No Action Alternative and Non-Settlement Alternative 2 and 3A.

D. Environmental Effects

The following sections include a general description of existing conditions relating to land use, water resources and socioeconomics for each entity. The following summaries also include a description of the existing conditions and brief description of the impacts to biological and cultural resources that would result from construction of CAP delivery facilities and conversion of desert and agricultural lands to urban uses.

1. Land Use

According to data from MAG, the land use designations in the City of Phoenix MPA in 1995 consisted of approximately 20,928 acres of agriculture, 182,017 acres of developed land, 10,024 acres of rural land, 188,456 acres of vacant land, and 11,325 acres of water, including lakes, rivers and canals. As described in the introduction to this appendix, the 1995 MAG categories were redefined into three new categories (i.e., agriculture, desert and urban). These 1995 data were also updated and adjusted based on reviews of the 1998 aerial photography and the field surveys that were completed to assess biological resources for this EIS. Table L-M&I-89 provides the projected acres of land within the City of Phoenix MPA that are agriculture, desert or urban and the number of acres expected to change from the existing category for the years 2001 and 2051.

Table L-M&I-89 CAP Allocation Draft EIS City of Phoenix – Projected Land Use Changes Within the MPA (in acres)							
Alternative	Year	Agriculture	Agriculture Urbanized	Desert	Desert Urbanized	Urban	Changes in Urban Acreage
Settlement Alternative	2001	22,400	--	148,144	--	242,206	--
	2051	7,948	14,452	72,156	75,988	332,646	90,440
No Action	2001	22,400	--	148,144	--	242,206	--
	2051	7,948	14,452	72,156	75,988	332,646	90,440
Non-Settlement Alternative 1	2001	22,400	--	148,144	--	242,206	--
	2051	7,948	14,452	72,156	75,988	332,646	90,440
Non-Settlement Alternative 2	2001	22,400	--	148,144	--	242,206	--
	2051	7,948	14,452	72,156	75,988	332,646	90,440
Non-Settlement Alternative 3A	2001	22,400	--	148,144	--	242,206	--
	2051	7,948	14,452	72,156	75,988	332,646	90,440
Non-Settlement Alternative 3B	2001	22,400	--	148,144	--	242,206	--
	2051	7,948	14,452	72,156	75,988	332,646	90,440

2. Archaeological Resources

Numerous surveys have occurred within the City of Phoenix MPA; however, much remains unexamined. Prehistorically, it was part of the Hohokam “core” area; identified loci of high and moderate cultural resource sensitivity—which extend onto the Cave Creek and the New River Dam Archaeological Districts, among others—reflect only a fraction of the City of Phoenix MPA’s prehistoric occupation density. Many of the large agricultural village sites located in the MPA (e.g., Pueblo Grande, Pueblo del Rio, Villa Buena, Las

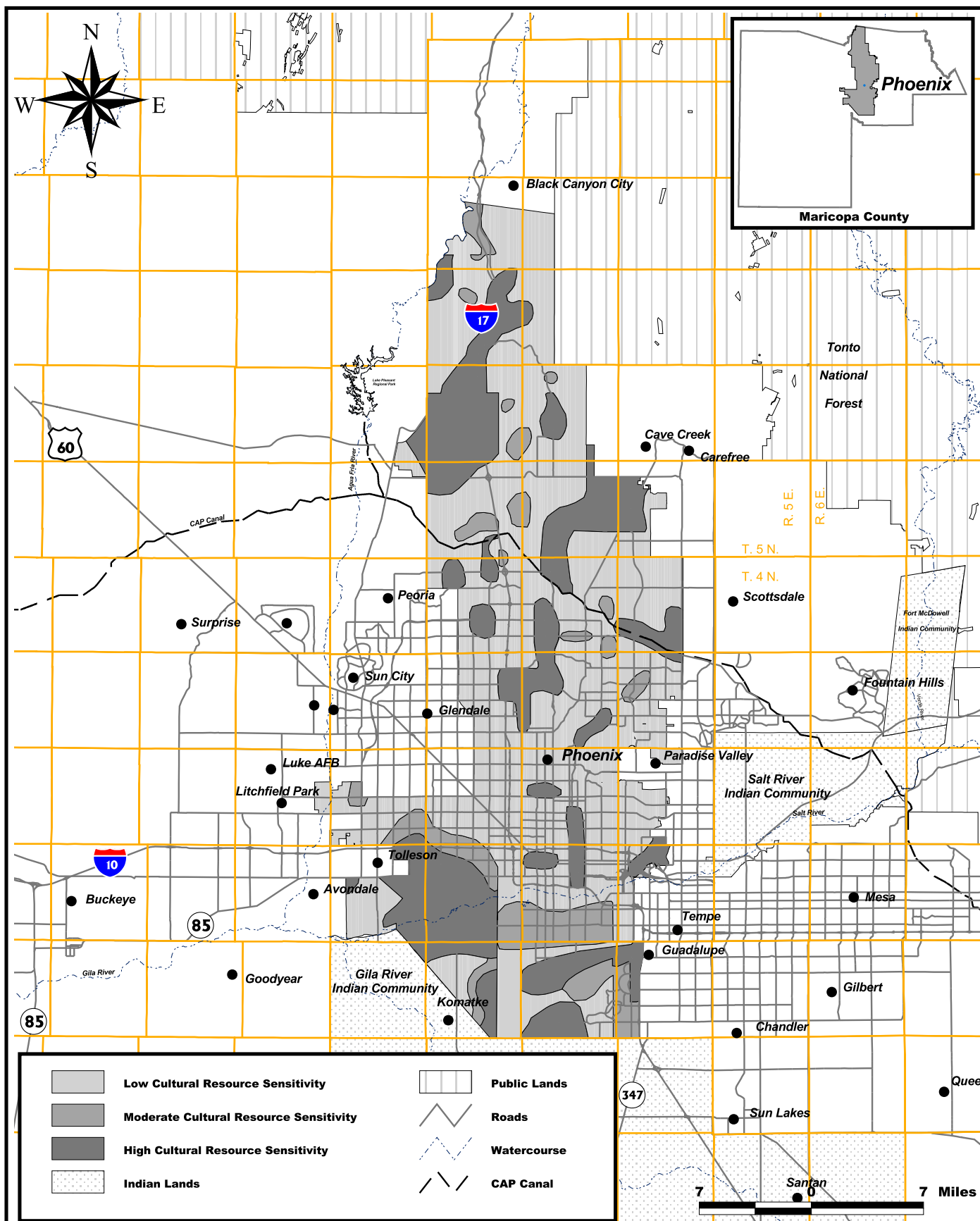
Canopas, Pueblo del Alamo, the Patrick Site, Dutch Canal Ruins, La Ciudad, Tres Aguas) were originally recorded in the late 1800s and the early 1900s by pioneers of Arizona archaeology such as Frank Cushing and Omar Turney; few surface remains are extant today. However, because the boundaries were carefully mapped and the material remains meticulously described the projected location of buried features can be estimated. Significant, intact subsurface cultural deposits are possible even in areas where all surface integrity has been destroyed by agriculture, urbanization, or other ground-disturbing activities (e.g., Aguila et al. 1999). As might be expected, the area's known prehistoric site types include material remains associated with a primarily agricultural economy (e.g., canals, rock features, ground stone artifacts, and specialized items such as tabular knives). Other items, including shell, turquoise, obsidian, and artifacts of Mesoamerican influence—such as palettes and copper bells—reflect the core area's participation in the Hohokam exchange system. Human remains both inhumations and cremations, are likely in the vicinity of the major sites. Protohistoric Pima sites also might be expected, although some deposits, particularly agricultural sites and features, might be indistinguishable from those of the Hohokam. Historic resources reflect the area's rich and complex heritage, and include sites associated with early Mexican, Anglo, and Mormon settlements, irrigated agriculture, transportation, and commerce.

Cultural resource sensitivity areas in the City of Phoenix MPA are shown on Figure L-M&I-45. Based on the limited data used to generate the cultural sensitivity designations, the potential for cultural resource impacts in the City of Phoenix MPA is high to moderate. Mitigation of cultural resource impacts due to urban expansion would be determined by local jurisdictions and development of applicable permit requirements (such as the CWA Section 404 permit). Impacts on cultural resources due to future land use changes would be identical for each of the five alternatives. Mitigation for such impacts would be dependent on the requirements of the local jurisdiction. The construction of the new Lake Pleasant Water Treatment Plant could impact previously unidentified cultural resources. If cultural resource surveys have not been carried out by the City of Phoenix, Reclamation would require such clearances as part of the CAP contracting process.

3. Biological Resources

Existing Habitats

The northern portion of the City of Phoenix MPA is a mosaic of soil types on a complex of hills, mesas, low mountain slopes, and associated drainages (below 3,300-foot elevation). Jojoba/mixed Scrub Association occurs in the higher hills, especially on north-facing slopes. Co-dominants include foothill paloverde, barrel cactus, brittlebush, wild-buckwheat, and turpentine-bush. Allthorn-Creosote Bush Association occurs on white sedimentary soil in this area where co-dominants include staghorn cholla and little-leaved krameria, and with soil indicator species such as tiquilia and Arizona buckwheat. Bursage-Foothill Paloverde Association occurs on igneous soils of the gentler, more south-facing



June 2000

CAP Allocation Draft EIS **Cultural Resources** **City of Phoenix**

Figure #L-M&I-45

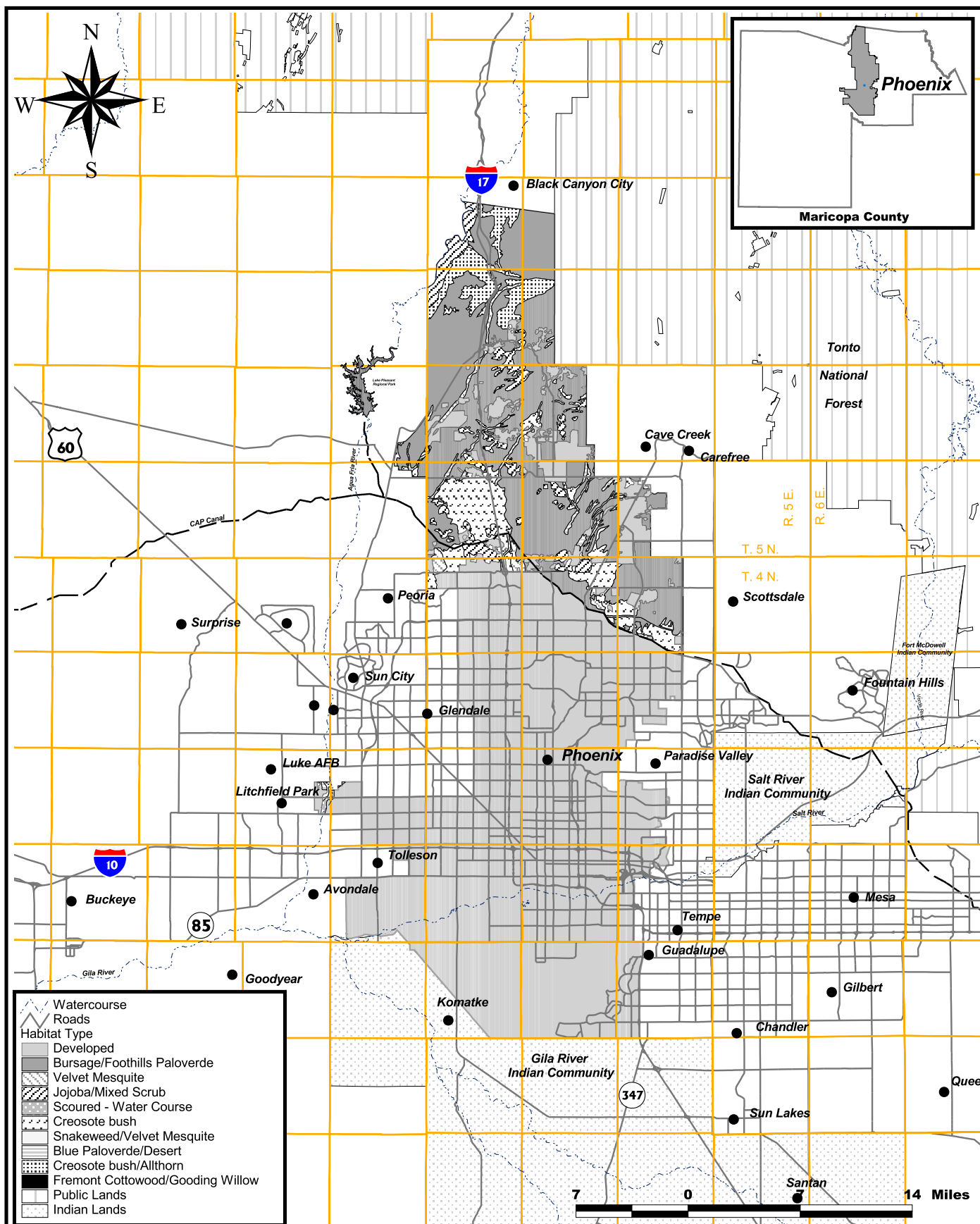
slopes and on gravelly soils of the lower plains. Co-dominants include creosote-bush and staghorn cholla. Other common trees include velvet mesquite, desert ironwood, blue paloverde, and saguaro. Saguaro density is moderate. Silty plains within the southern portions of the MPA are dominated by Creosote-bush Association. Blue Paloverde/Desert Ironwood Association habitat occurs along major ephemeral washes. The habitat zones are shown on Figure L-M&I-46. Table L-M&I-90 provides the habitat acreages for the habitat zones described above.

Table L-M&I-90 CAP Allocation Draft EIS City of Phoenix– Habitat Acreages	
Vegetation Name	Acres
Developed	264,606
Bursage/Foothills Paloverde	100,202
Velvet Mesquite	3,023
Jojoba/Mixed Scrub	11,181
Scoured, Washes and Creekbeds	321
Creosote Bush	19,260
Blue Paloverde/Desert	4,435
Creosote Bush	9,722
Total	412,750

Impacts to Biological Resources

Under the No Action Alternative, urban growth within the City of Phoenix MPA over the 50-year study period would result in loss of an estimated 75,988 acres of Sonoran desertscrub and associated wildlife resources. There may be indirect impacts on wildlife occurring in adjacent undeveloped habitat. An estimated 14,452 acres of farmland would be urbanized. This urbanization of the farmland would result in the creation of fallow fields for some undetermined length of time. Fallow agricultural fields in the area may be used by burrowing owls, a species protected under the MBTA. Individual developers who convert fallow lands for urban uses would be responsible for ensuring burrowing owls are removed prior to development. Failure to do so would be considered a violation of the MBTA. With regard to biological resources, there is no difference in impacts among the five alternatives. Under the action alternatives, there is no difference in impacts from the No Action baseline. With regard to new facilities to take or treat the additional CAP allocation, the City of Phoenix is planning to construct a new treatment plant for CAP water on the east side of Waddell Canal, near Lake Pleasant. The construction of this facility could impact approximately 50 acres of desert habitat. Reclamation would carry out additional environmental review based upon specific plans prior to construction.

Potential T&E Species and Acres of Potential T&E Species Habitat



June 2000

CAP Allocation Draft EIS **Habitat Zones** **City of Phoenix**

Figure No. L-M&I-46

Because the allocation of CAP water has no effect on urban growth, there would be no effect on T&E species from the CAP allocation. The City of Phoenix would be responsible for complying with the relevant provisions of the ESA as it permits and approves future urban growth.

The City of Phoenix MPA is located within Maricopa County for which there are 14 T&E species listed by the USFWS. Potentially suitable habitat only exists for cactus ferruginous pygmy-owl, southwestern willow flycatcher, Arizona cliffrose and Arizona agave. Approximately 107,660 acres of potentially suitable habitat for the cactus ferruginous pygmy-owl were identified within the Phoenix MPA. Also, approximately 207 acres above 3,000 feet of potentially suitable habitat for Arizona agave and approximately 4,435 acres of potentially suitable habitat for Arizona cliffrose were identified. Potential suitable habitat for southwestern willow flycatcher may occur in isolated pockets along the New River or Aqua Fria River. However, construction within riparian corridors would require issuance of CWA Section 404 permits by the Corps. As part of the permitting process, the Corps would have to comply with Section 7 of the ESA, and detailed surveys for T&E species would be carried out as necessary.

4. Water Resources

Demands in the City of Phoenix have historically been met with groundwater and with Salt River water for areas within the SRP service area. The city covers an extensive geographic area, and groundwater conditions can vary significantly between those areas. In some areas, groundwater levels have dropped substantially in response to groundwater pumping, while in other areas groundwater levels have remained relatively stable. Subsidence has been experienced in those areas with substantial drops in groundwater levels. Similarly, groundwater quality can vary substantially, with concentrations of TDS ranging from less than 500 to more than 1,000 ppm.

Estimated groundwater level impacts are summarized in Table L-M&I-91, which shows the estimated groundwater level change for the period from 2001 to 2051 as well as the groundwater level impacts or the difference between the change in groundwater levels for each alternative relative to the change for the No Action Alternative. The City of Phoenix falls within five groundwater sub-areas used for the analysis. Table L-M&I-91 shows estimated groundwater conditions first in the northern part of the East SRV, and then in the northeastern, northwestern, southeastern, and southwestern parts of the West SRV.

Under the No Action Alternative, groundwater levels would decline in all of the areas of Phoenix considered over the 2001 to 2051 period. These declines result from continued reliance on groundwater to meet demands, both in the City of Phoenix and in adjacent entities. These declines are relatively large (more than 100 feet) in the East SRV and in the

portion of the city in the eastern part of the West SRV. Smaller declines (less than 100 feet) occur in the portion of the city in the western part of the West SRV. The smaller decline in these areas reflects the impacts of recharge in the Salt and Gila Rivers and recharge of CAP water in the Agua Fria Recharge Project. Under the No Action Alternative, there could be reduction in the quality of groundwater due to the northerly movement of relatively poor quality water beneath the Salt and Gila Rivers to the north. There would also be the potential for subsidence throughout the city.

Groundwater levels would also decline over the 2001 to 2051 period throughout the City of Phoenix under the Settlement Alternative and all Non-Settlement Alternatives. In general, the groundwater levels would be similar to (within 10 feet) the groundwater levels under the No Action Alternative. The exception would be for those parts of Phoenix in the more northerly parts of the West SRV. Groundwater levels in those areas would be deeper than under the No Action Alternative (particularly for the Settlement Alternative and Non-Settlement Alternatives 3A and 3B) in large part due to reductions in the volume of direct recharge of CAP water in the Agua Fria Recharge Project. Water quality and subsidence for the Settlement and Non-Settlement Alternatives would be similar to the No Action Alternative.

Table L-M&I-91 CAP Allocation Draft EIS City of Phoenix-Groundwater Data Table		
Alternative	Estimated Groundwater Level Change from 2001-2051 (in Feet)	Groundwater Level Impact** (in Feet)
No Action	-147/-295/-35/-160/-11	--
Settlement Alternative	-141/-313/-78/-165/-20	6/-18/-43/-5/-10
Non-Settlement Alternative 1	-145/-307/-34/-165/-14	2/-11/1/-51/-3
Non-Settlement Alternative 2	-147/-297/-44/-160/-12	0/-2/-9/0/-1
Non-Settlement Alternative 3A	-148/-302/-68/-162/-16	-1/-6/-33/-2/-5
Non-Settlement Alternative 3B	-147/-313/-65/-167/-19	0/-18/-30/-7/-9
*Values correspond to the Scottsdale North, Phoenix North, Glendale/Peoria, Phoenix South, and Phoenix Southwest sub-areas, respectively, as discussed in Appendix I.		
** Computed by subtracting the estimated groundwater decline from 2001 to 2051 for the No Action Alternative from the estimated change in groundwater level for the same period for the alternative under consideration. The estimated impact is considered to be more accurate than the estimated decline in groundwater levels.		

5. Socioeconomic

The same population growth is supported under all alternatives, including the No Action Alternative. However, the cost of providing water may vary by alternative. Costs were estimated, on a per af basis, for providing the proposed allocations and, in their absence, alternative water supplies. The alternative water supplies include joining the CAGR D and, if needed, treating and reusing effluent. The difference in cost for this small increment of the City of Phoenix's total water supply is considered insignificant. It should be noted that the increment of demand met by the proposed CAP allocation is approximately 1.6 percent of the total year 2051 demand for the City of Phoenix.

Table L-M&I-92 CAP Allocation Draft EIS City of Phoenix –Cost of Potable Water for Additional Allocation Increment		
Alternative	Cost of Water (\$ per af)	Water Source
Settlement Alternative	154 ^{a,c}	CAP Allocation
No Action	295 – 301 ^b	CAGR D
Non-Settlement Alternative 1	154 ^a	CAP Allocation
Non-Settlement Alternative 2	295 – 301 ^b	CAGR D
Non-Settlement Alternative 3A	295 – 301 ^b	CAGR D
Non-Settlement Alternative 3B	154 ^a	CAP Allocation
Notes: a. Estimated average unit cost in year 2000 dollars. b. Estimated range of unit costs in year 2000 dollars. Range is due to estimated change in groundwater pumping lifts during study period and does not include wellhead treatment costs. c. Does not include monetary contribution to the GRIC Settlement.		